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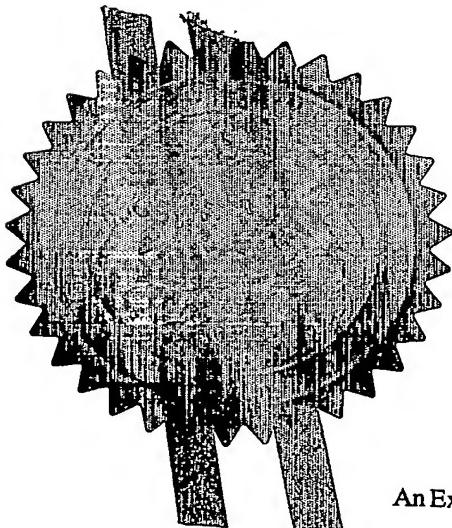
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Dated 23 July 2003



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19AUG02 E741872-1 D00393
P01/7700 0.00-0219209.4

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
Gwent NP10 8QQ

1. Your reference

2002P12987 GB / P72 / CF / GD

2. Patent application number

(The Patent Office will fill in this part)

0219209.4

17 AUG 2002

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

OXFORD MAGNET TECHNOLOGY LTD.
WHARF ROAD, EYNSHAM
OXFORD OX8 1BP

Patents ADP number *(if you know it)*

64776002

UNITED KINGDOM

4. Title of the invention

MANAGEMENT OF COMPRESSOR OIL CARRY
OVER TO THE PTR COLD HEAD

5. Name of your agent *(if you have one)*

Siemens Shared Services Limited
Intellectual Property Department
The Lodge, Roke Manor
Romsey
Hampshire SO51 0ZN

08439358001

Patents ADP number *(if you know it)*

If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each these earlier applications and *(if you know it)* the or each application number

Country Priority application number
(if you know it)

Date of filing
(day / month / year)

If this application is divided or otherwise derived from an earlier UK application, give the number and the filling date of the earlier application

Is a statement of inventorship and of right to grant of a patent required in support of

Yes

this request? (Answer 'Yes' if:

- a) any application named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d))

9. Enter the number of sheets for any of the following items you are filling with this form.
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Continuation sheets of this form

Description	1
Claim(s)	0
Abstract	0
Drawing(s)	1+1

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translation of priority documents

Statement of inventorship and right to grant a patent (Patents Form 7/77)

1

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents
(please specify)

11.

I/We request the grant of a patent on the basis of this application

Signature

Date

Clive French

16.08.2002

Intellectual Property Department

12. Name and daytime telephone number of Person to contact in the United Kingdom

Clive French

01794 833573

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Notes

- a) If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505
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- e) Once you have filled in the form you must remember to sign and date it.
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Management of Compressor oil carry over to the Pulse Tube refrigerator (PTR) Cold head

Authors : Milind Atrey, D. Crowley, P. Daniels

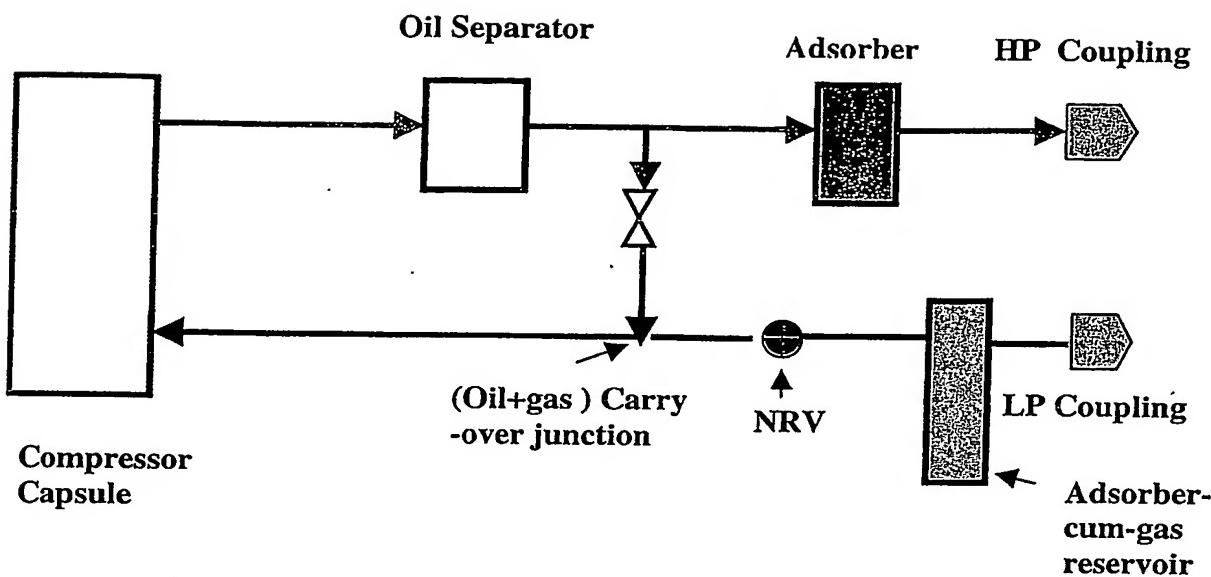
Oil Carry over in the PTR

It is observed that oil migrates from the compressor to the PTR cold head through the Low pressure (LP) flex line. The reason for this is a high pressure difference developed due to stoppage of the PTR's rotary valve when the compressor is dynamic. When the rotary valve stops, the compressor pressure increases to a very high value, 28-29 bar approximately, and the low pressure flex line experiences a sudden fall in the pressure down to 1.5- 2 bar approximately. As a result, a part of the (oil+ gas) mixture is bypassed internally without going to the adsorber and also travels across the non return valve (NRV) due to high pressure difference. If this action continues over a period of time, the LP flex line becomes flooded with oil and then the PTR cold head and the high pressure flex line also. The PTR in this condition can not function satisfactorily and one may have to discard the whole system due to severe contamination.

Modification in compressor circuit to overcome Oil-migration

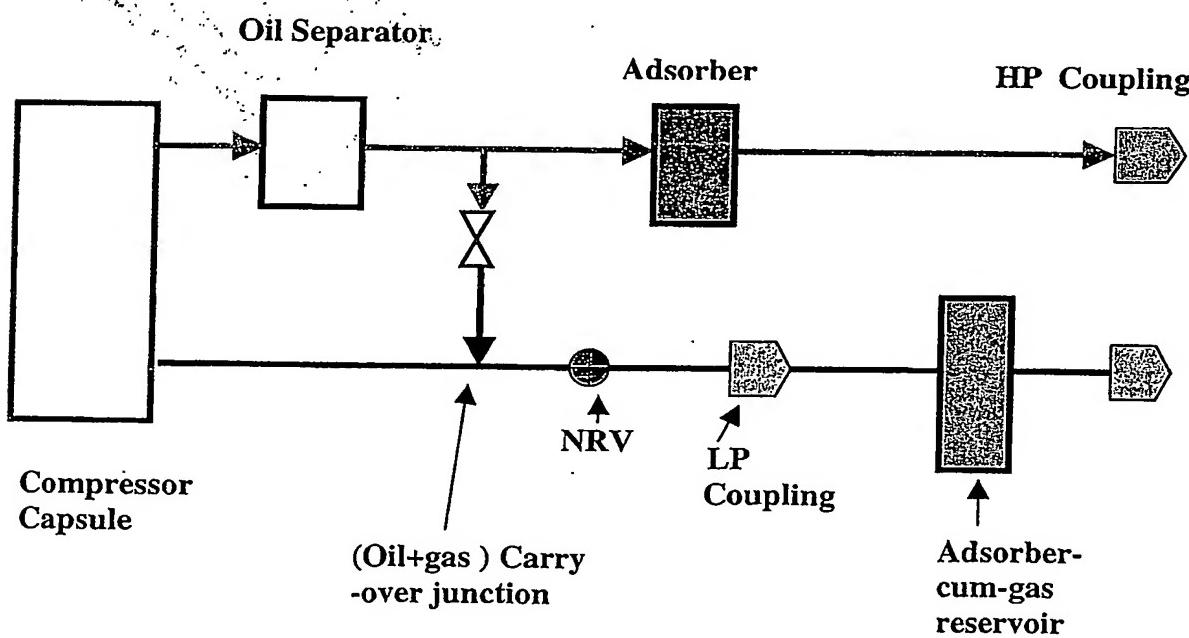
It is proposed to have an adsorber in the LP line after the NRV as shown in the schematic -1. This serves two purposes, both prevention and cure of oil carry over. Having a gas reservoir in the LP helps to reduce the pressure differential across the NRV when the Rotary valves stops suddenly. This prevents or decreases the risk of oil migration depending on the volume of the gas reservoir. On the other hand, if the oil migrates, the adsorber would strip the gas of the oil and only gas would travel to the PTR cold head.

The same purpose could be served if the adsorber is kept after the LP self sealing coupling by employing a length of flex line outside the compressor unit. It can then be connected to the PTR cold head using one more self sealing couplings.



Schematic – 1

Adsorber between NRV and LP connector



Schematic – 2

Adsorber after LP connector